Remarks/Arguments

Summary

Claims 1 and 19 have been amended. Claims 1-2, 4-10, 12-13, and 19-21 remain pending in this application.

Allowable Subject Matter

Applicants wish to thank the Examiner for acknowledging allowable subject matter in claims 7-10 and 19-20.

Claim Rejections – 35 U.S.C. § 102(b)

Claims 1, 5-6, 13, and 21 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,814,839 to Hosoba ("Hosoba"). Applicants respectfully traverse these rejections for at least the following reasons.

Claim 1

Without acquiescing to the Examiner's reasoning, claim 1 has been amended to recite the following:

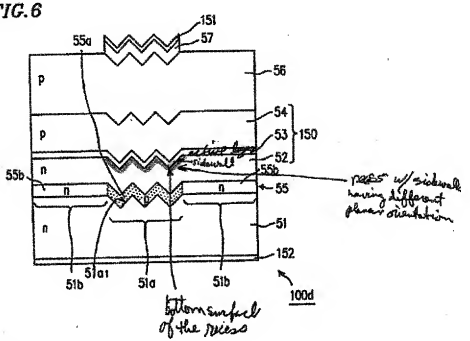
> a recess formed on a major surface of the n-type semiconductor layer, the recess having a planar bottom surface with a crystal orientation and planar sidewalls each having a different crystal ~~planar~~ orientation from the bottom surface;

The term "crystal orientation" has been added to clarify the meaning of the claim language in accordance with comments made by the Examiner and Mr. Anh Mai in the interview conducted at the USPTO on February 22, 2007. In the interview, the Examiner and Mr. Mai explained that they interpret the term "planar" to mean "flat" and the term "planar orientation" to mean a particular location of a planar surface in 3D space, regardless of the context in which these terms are used, and in spite of the use of these terms in the illustrations and explanations of the present specification.

The Examiner and Mr. Mai suggested that a term such as "crystal orientation" should be used to describe the orientations of crystals such as those illustrated in FIGS. 10 and 11 of the present application and described on page

10 of the present specification. In addition, the Examiner and Mr. Mai both agreed that this clarifying language would distinguish claim 1 from Hosoba, since the putative bottom surface of the so-called "recess" in Hosoba is nothing more than an intersection between sidewalls indicated in the Examiner's annotated version of FIG. 6 of Hosoba shown below. As such, the putative bottom surface does not have a distinct "crystal orientation" from the sidewalls.

FIG. 6



Applicants further note that even if claim 1 had not been amended to include the term "crystal orientation", claim 1 would still define over Hosoba because the putative bottom surface of the recess in Hosoba is not a "planar bottom surface" as recited in claim 1. As discussed in the telephone conversation dated January 22, 2007 and the interview dated February 22, 2007, the putative bottom surface in Hosoba cannot be reasonably interpreted as a planar bottom surface because the intersection between the so-called sidewalls in FIG. 6 of Hosoba merely defines a line instead of a plane from a macroscopic perspective. Even under the current Office Action's interpretation of the term "planar" as meaning "flat", one can still see in FIG. 6 that Hosoba does not disclose a "flat" bottom surface, either from a macroscopic perspective or a microscopic perspective.

Moreover, in the telephone conversation dated January 22, 2007, the Examiner *admitted* that the bottom surface of Hosoba was not a planar surface, leading to the previous amendment including the term "planar bottom surface" (See, Amendment dated January 24, 2007, page 6, paragraph 2). Accordingly, the current rejection directly contradicts the Examiner's previous stated position (Id.).

Because Hosoba does not disclose a planar bottom surface nor a planar bottom surface having a different crystal orientation from the sidewalls, claim 1 is deemed patentable over Hosoba.

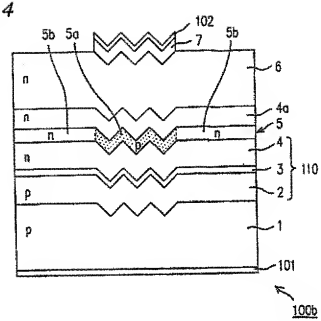
Claims 5-6, 13, 21

Claims 5-6, 13, and 21 depend from independent claim 1 and are deemed patentable for at least the reasons described above in relation to claim 1. In addition, these claims are deemed patentable for at least the following reasons.

Claim 6

The final office action ***again*** rejected claim 6, stating that "Hosoba discloses that at least one of surfaces of the n-type *semiconductor layer 250* (fig. 4) contiguous to the *active layer 310* (fig. 4) is a surface vertical to the major surface of the n-type semiconductor layer 250." (See, Office Action, page 3, paragraph 2, emphasis added). Fig. 4 of Hosoba is shown below.

FIG. 4



By inspection of Fig. 4, it can clearly be seen that Fig. 4 of **Hosoba does not contain any elements labeled 250 or 310**. Accordingly, the rejection of claim 6 is factually defective and should be withdrawn.

It should be noted that this is at least the third time that Applicants have brought this factual error to the Examiner's attention. Each time, the Examiner has ignored Applicants' remarks and failed to provide a proper basis for the rejection. Accordingly, Applicants respectfully remind the Examiner of the MPEP's stated goal of Examination:

> "The goal of examination is to *clearly articulate* any rejection early in the prosecution process so that the applicant has the opportunity to provide evidence of patentability and otherwise reply completely at the earliest opportunity." (See, MPEP 706, emphasis added).

In view of the above goal, Applicants respectfully request the Examiner's future cooperation in providing a fair opportunity to further the prosecution of claim 6 and also all other claims in this application.

Claim 13

Claim 13 recites "wherein the active layer emits light components having two or more *different major peak wavelengths*, and the light components are

mixed to produce a color." (emphasis added). Hosoba fails to recite this feature. Instead, Hosoba only discusses emitting light with **one** peak wavelength: "pure green emitted light...at a peak wavelength of 555nm" (See, Hosoba at col. 25, lines 45-47). Accordingly, the rejection of claim 13 is defective and should be withdrawn.

It should be noted that this error has been brought to the Examiner's attention in numerous responses to previous Office Actions, and also in the interview on February 22, 2007. Nevertheless, the Examiner continues to ignore Applicants' remarks and has failed to support the rejection or to rebut the arguments presented. If Examiner wishes to maintain the rejection of claim 13 under 35 U.S.C. § 102(b), the Examiner must provide an answer to the following question: ***Where does the disclosure of Hosoba describe emitting light components with two or more different peak wavelengths and mixing the components to produce a color?***

In analyzing this question, Applicants respectfully request the Examiner to consider the following related questions: What are the two or more components supposedly disclosed in Hosoba? How are they mixed?

Absent proper support, the rejection of claim 13 cannot be maintained. Accordingly, Applicants respectfully request withdrawal of the rejection of claim 13.

Claim 21

The Office Action again rejected claim 21 under 35 U.S.C. § 102(b), stating that "Hosoba discloses that the recess is a triangle-shaped recess (fig. 6)" (See, Office Action, page 3, paragraph 5). However, this rejection is improper for at least the following reasons.

First, the Office Action apparently ignores the following language of claim 21: "as viewed from an ***upper surface*** of the n-type semiconductor layer" (emphasis added). FIG. 6 does not even show a view from an upper surface of an n-type semiconductor layer, but instead shows a ***side-view*** of n-type cladding

layer 52, which the Office Action equates with the n-type semiconductor layer of claim 21.

Since the Office Action does not actually point out any disclosure in Hosoba showing recesses that are triangle-shaped when viewed from an upper surface of an n-type semiconductor layer, the rejection of claim 21 is defective.

Second, the V-grooves in layer 52 are apparently linear. Accordingly, when viewed from an upper surface of layer 52, the grooves would appear as lines, not triangles. Moreover, even the Examiner's rejection of claim 10 maintains that the V-grooves in layer 52 are "striped". Accordingly, the Office Action's rejection of claim 10 is inconsistent with the Office Action's rejection of 21.

Third, in the interview dated February 22, 2007, and in the Examiner's written summary of the same, the Examiner explicitly acknowledged that triangle-shaped recess now described in claim 21 is different from the so-called recess in Hosoba. The interview summary states "Mr. Westover also discusses the triangle shape of the recess which is different from Hosoba's recess" (See, Interview Summary).

Because Hosoba does not disclose triangle-shaped recesses such as those recited in claim 21, the rejection of claim 21 is improper and should be withdrawn.

Claim Rejections – 35 U.S.C. § 103(a)

Claims 2, 4, and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hosoba in view of US Patent No. 6,285,698 to Romano et al. ("Romano"). These rejections are traversed for at least the reasons described above in relation to claim 1, and also for the following reasons.

As described in a response to the Office Action dated May 17, 2006, one skilled in the art would not combine the teachings of Hosoba and Romano for several reasons. Under recent Supreme Court precedent, a finding of obviousness under 35 U.S.C. § 103(a) must be supported by "an *apparent reason* to combine the known elements in the fashion claimed by the patent [or

application] at issue. To facilitate review, this analysis *should be made explicit*" (See, *KSR v. Teleflex*, 550 U.S. ____ (2007), http://www.supremecourtus.gov/opinions/06pdf/04-1350.pdf, p. 14, emphasis added).

As described in the Office Action response dated September 11, 2006, reason does not support the proposed combination of Hosoba and Romano. To the contrary, Hosoba and Romano both present a number of reasons why their teachings should *not* be combined. First, the purpose of grooves 255 in Romano is entirely different, and in some ways even contradicts, the purpose of V-grooves $51a_1$ of Hosoba. For example, grooves 255 are formed in Romano to relieve *physical stress* in light emitting structures using InGaN grown over group III-V nitride layers. (See, Romano at col. 3, lines 6-11 and 47-53). In contrast, the structures of Hosoba are AlGaInP structures, which have different crystal structure properties from InGaN crystals and therefore do not suffer from the same physical stresses as the InGaN structures. V-grooves $51a_1$ are formed in Hosoba to address various issues related to producing high intensity light. In addition, V-grooves $51a_1$ are formed in GaAs substrate 51 before forming AlGaInP layers thereon in order to avoid performing multiple AlGaInP growth steps when forming layers 52-54 (See, e.g., Hosoba at col. 3, lines 63-65). In contrast, Romano forms layers 250, 310, and 320 by performing a "two-step epitaxial growth procedure, where the second growth step is performed on a pre-patterned surface" (See, Romano at col. 3, lines 33-36). The two-step procedure is used by Romano to give stability to the structure formed thereby (See, e.g., Romano at col. 3, lines 47-53).

Since the disclosures of Romano and Hosoba are designed to address different and contradictory concerns that arise in different types of light emitting devices, one skilled in the art would not have combined the teachings of Romano and Hosoba as suggested by the Office Action. Further, since the device presented in Hosoba is specifically designed to *avoid* using a two-step growth procedure such as that suggested by Romano, one skilled in the art would not have combined Romano and Hosoba as suggested by the Office Action.

Regarding claim 2, the Office Action claims that it would be obvious to modify Hosoba in view of Romano so that semiconductor layers 52, 53, and 54 comprise gallium nitride layers. (See, Office Action at page 5, paragraph 1). However, as described above and in Romano, gallium nitride alloys have disadvantageous cleaving behavior and growth characteristics relative to other crystalline structures (See, Romano at col. 3, lines 5-32), making it unlikely that one would arbitrarily exchange the AlGaInP of layers 52-54 in Hosoba with gallium nitride layers as suggested by the Office Action. Further, the disclosure of Hosoba at col. 3, lines 28-31 appears to explicitly exclude group (III-V) nitrides such as gallium nitride from its device, giving even more reason why it would not be obvious to combine Hosoba with Romano.

Regarding claim 12, the Office Action discusses Romano without relating the disclosure of Romano to any part of Hosoba. For example, the Office Action fails to discuss any way in which the teachings of Hosoba and Romano could be combined to read on claim 12 and the Office Action fails to provide any reason why one skilled in the art would combine the teachings. Since Hosoba and Romano have different electrode configurations, it is unclear how or why one skilled in the art would modify Hosoba with the teachings of Romano to read on claim 12. Absent proper support, the Office Action's rejection of claim 12 under 35 U.S.C. § 103(a) is improper and should be withdrawn. Further, as discussed in the March 3, 2006 response to the October 6, 2005 Office Action, the electrodes shown in Fig. 4 of Romano are distinct from those recited in claim12 and therefore even if combined with Hosoba, would not read on claim 12.

The Examiner argues that it would be obvious to combine the teachings of Hosoba and Romano to "provide a wide range of wavelengths", and to "provide a wide bandgap necessary for short wavelength visible emission" (See, Office Action, page 5). However, even if these statements represented true *consequences* of combining Hosoba with Romano, they do not represent legal *reasons* to support an obviousness rejection – i.e., the rejection is based on a logical fallacy. In other words, just because a proposed combination might

produce a particular consequence doesn't mean that the combination is reasonable or that it would be obvious to pursue.

Similarly, the question of whether it would be obvious to combine Hosoba and Romano depends on a variety of factors, including e.g., the negative side effects of making the combination, the desirability of trying to achieve Romano's technical specifications on Hosoba's platform when Romano already achieves the cited results (i.e., based on the Examiner's citations of Romano, col. 2, lines 5-10 and col. 2, lines 15-20), and so on. Because of the many reasons provided above as to why one skilled in the art would not combine Hosoba with Romano, the rejection of claims 2, 4, and 12 under 35 U.S.C. § 103(a) is defective and should be withdrawn.

In a similar vein, Courts have consistently held that a finding of obviousness cannot be premised on naked conclusory statements without support from some articulated reasoning. (See, e.g., *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obvious-ness"). In the present case, the Examiner's one line conclusory statements relating to obviousness can hardly be viewed as articulated reasoning under current legal doctrines or USPTO practice. Accordingly, the Office Action fails to support a conclusion of obviousness under 35 U.S.C. § 103(a).

Because the Office Action has failed to formulate a proper grounds for rejection under 35 U.S.C. § 103(a), the rejections of claims 2, 4, and 12 under 35 U.S.C. § 103(a) are defective and should be withdrawn.

Double Patenting

The Office Action rejected several claims under the judicially created doctrine of obviousness-type double patenting. The Office Action states that "applicants fail to submit a response to the double patenting rejection in the previous Office Action" (See, Office Action, p. 7, paragraph 3).

Applicants respectfully note that a terminal disclaimer was submitted to the USPTO on September 11, 2006 to overcome the double patenting rejection in the previous Office Action. A stamped postcard was mailed to the applicants by the USPTO, indicating that the terminal disclaimer was received at the USPTO on September 11, 2006. In addition, a copy of the terminal disclaimer appears in the image file wrapper for the present application on private PAIR, demonstrating that the USPTO is in possession of the terminal disclaimer.

Because Applicants believe that the Examiner should have received the terminal disclaimer, Applicants respectfully request acknowledgement of the terminal disclaimer and withdrawal of the current rejections based on double patenting.

Conclusion

No further issues remaining, Applicants respectfully request withdrawal of the current rejections and allowance of pending claims 1-2, 4-10, 12-13, and 19-21.

Respectfully submitted,

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Date: June 8, 2007

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